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THESIS

INTRODUCTION AND IMPLEMENTATION OF INTRANET IN THE ZIMBABWE NATIONAL ARMY

by

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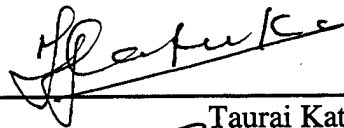B.Tech Civil Eng. University of Zimbabwe 1992

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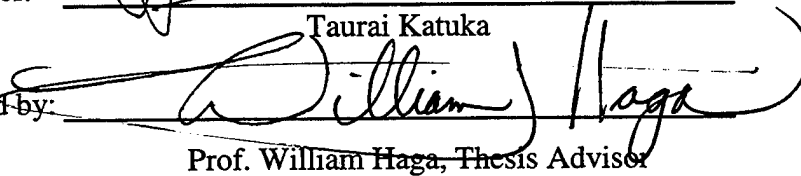## IN INTERNATIONAL RESOURCE PLANNING AND MANAGEMENT

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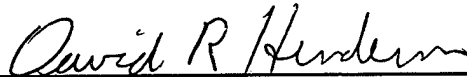## NAVAL POSTGRADUATE SCHOOL
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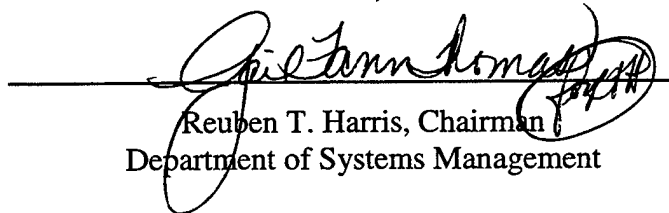Taurai Katuka

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ABSTRACT

The objective of this thesis is to make a study of possible introduction and implementation of Intranet in the Zimbabwe National Army. Intranets, internal networks based on the same technology and protocol as Internet (World Wide Web), have emerged in the past five years as the most popular medium of communication within organizations. Many organizations are flocking to this new medium of communication in order to improve and enhance their market share. A quantitative approach in obtaining data through questionnaire for this thesis could not be implemented due to circumstances beyond the control of the author. Limited telephone interviews were then conducted instead. The primary assumption of the thesis was that the introduction and implementation of Intranet is similar to the introduction and implementation of any other information system. Hence, a sample of senior army officers responsible for communication and procurement was interviewed. The interviews revealed that a process of implementing is heavily dependent on such variables as structure, culture and size of the organization. The process of implementation includes such phases as leadership buy-ins, prototype introduction, and Intranet refinement. The author concludes that implementation of an Intranet would improve on Zimbabwe National Army's communication system.

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CHAPTER I

INTRODUCTION

A.   GENERAL

"You can actually implement Intranet in any organization if there is a need to communicate beyond small defined groups, there are more than ten employees, located in more than one location, it is in service business and there is a need to contact clients electronically."   These were the words of Haga (1998) in introducing Intranets and LANs to an Information Technology (IT) course.   At that time, Haga's statement sounded strange but after discussing case studies in class, I came to a conclusion that it is true.   The case study that influenced my decision is the story of Singapore port authority computerized its customs clearance system and established a network with shipping companies, freight agencies and customs offices.   This reduced the time spent by ships at Singapore as clearance was done whilst the ship was still at sea.   This network reduced the paper work involved, as well as the number of government offices that freight agencies visited to clear shipment.   Everything is now done electronically.

The pre-period of Singapore harbor compares with how information is processed and communicated in the Zimbabwe National Army which is basically by paper documents.   For every transaction a minimum of five to eight papers must be completed and three to four offices must be visited.   The Singapore success story has motivated an examination of the issues and opportunities for implementing Intranets in the Zimbabwe National Army.

B. BACKGROUND

The Zimbabwe National Army [ZNA] has Camps (Bases) throughout the country. The furthest Base is about 1,000 kilometers (650miles) from the Army Headquarters. The administrative communication system is mostly done through the public postal services under normal circumstances. If there is an industrial action by the postal services employees, dispatch riders are sometimes used to deliver mail to Bases. In most cases mail delivery is late because there are no public postal facilities at these remote Bases. These Bases collect their mail from the nearest post office.

Apart from the postal service system, ZNA also uses fax machines, telex and telephone for administrative communication. However, the use of the fax machine is limited in that one fax machine serves a population of about 5000 people. A telex machine uses expensive imported paper that limits full use.

The ZNA currently has an MV2000 main frame computer capable of processing data for the entire Zimbabwe government. But the computer is used mainly for processing pay for about 40000 soldiers and providing a limited word, processing to 30% of the army headquarters staff. However, plans are under way to replace this old computer with a modern one. It is against this background that this under used computer be fully used as a message information center (MIS) as well. It will then be linked to other stations via satellite. The Japanese built Mazoe earth satellite station may be used to transmit or to link to other stations that will be built on strategic points near remote camps.

C.   OBJECTIVES

The purpose of this thesis is to make a study of possible introduction and implementation of Intranet in the Zimbabwe National Army as an added vehicle for administrative communication system.   It will examine the mode of current administrative communication system and their shortfalls.

The thesis will address these questions:

♦ In what way could an *Intra*net improve readiness and effectiveness of ZNA communication system?

♦ What elements of ZNA organizational politics and organizational culture might impede the adoption of *Intra*net?

♦ What is the state of electronic communication within ZNA prior to an *Intra*net?

♦ What are the quantifiable costs and budgets of *Intra*net to ZNA?

D.   BENEFIT OF THE STUDY

If the project is adopted, it will help improve the flow of information from Defense Headquarters to Army headquarters, brigades and units under command. Not only will an Intranet improve information flow, there will also be an introduction of new technology in the country as a whole. It will also modernize the Zimbabwe Staff College Tactical Trainer by introducing and conducting computer-simulated war-games. These war games could be designed in any architecture of either the division, brigade or battalion battle groups.

E. WHAT ARE INTRANETS AND WHY WE NEED THEM

An Intranet is a small-scale version of the Internet inside an organization that uses a firewall to keep out intruders. Basically, an Intranet is a network based on the Internet protocol TCP/IP that uses World Wide Web (WWW) tools such as Hypertext Markup Language (HTML), Common Gateway Interface (CGI) scripts, browsers and Java programming language. The functionality of the Internet can be made available on a private Intranet inside a command or organization.

1. Proliferation Information

Nearly every market research firm in the technology business considers Intranets to be the outstanding area in networking. As predicted by Creative Network, Incorporated, of Palo Alto, California (1997), the use of Intranets in the enterprise grew by more than 110 percent by the end of 1997. Zona Research Incorporated, based in Redwood California, expects corporate web server shipment destined for Intranet use to surpass that for Internet use in 1998. This will create more than three million Intranet servers and slightly more than half a million Internet servers by the end of 1999. Gartner Group predicts that 75% of all Fortune 1000 organizations will be running Intranets by the end of 1999.

Driving the popularity of Intranets is their inherent cross-platform support and low deployment costs. As organizations invest maintenance resources in an Intranet model, it becomes increasingly important to make the model work at the core an organization of business operations. (Doolittle, 1997, p 80).

2. Intranet Uses

Intranets are primarily used as medium of information exchange. They take advantage of the web technology's ease of use to empower workers through the increased proliferation of information. Some examples of Intranets uses are: electronic mail, quality statistics, directories, asset management, inventory information, personnel manuals, financial reports, training, organizations charts, job postings, supply/component catalogs and many more.

II. ZNA CURRENT COMMUNICATION SYSTEM

A. BACKGROUND

The independence of Zimbabwe in 1980 gave birth to the Zimbabwe National Army (ZNA). At independence, Zimbabwe inherited three different and almost incompatible armies, namely Zimbabwe African National Liberation Army (ZANLA), Zimbabwe Peoples Revolutionary Army (ZIPRA) and the Rhodesian army. There was therefore a need to integrate these armies into a national army under a single command structure. This was a difficult and essential task that had to be accomplished in less than five years from the date of independence. The integration of the three armies was successfully completed in three years.

Although the integration of the three armies was well received both internally and externally, it created logistical problems that were not in the purview of politicians. It created office and housing accommodation shortages as two other armies had to share existing former Rhodesian army buildings. Not only were buildings being shared but also other facilities (such as communication systems) which go with the buildings were being shared.

The communication problem was further compounded when more camps were built throughout the country as a measure to alleviate the office and housing accommodation for the troops. Some camps were built in remote areas where telephone communication is very limited. The public postal offices are often located within miles of the camps. The postal services became the most reliable mode of administrative communication system in the Zimbabwe National Army.

B. TYPES OF MODES OF COMMUNICATIONS

The Zimbabwe National Army uses public postal services as its administrative mode of communication system (manual) and limited electronic mode of communication, the telex, fax as well as the telephone services.

1. Manual (Public Postal Service) Mode of Communication

The public mail delivery service in Zimbabwe is by the Post and Telecommunication Corporation (PTC), which is the nation's postal service agent. There are other courier services such as the DHL that ZNA does not use because of the higher charges involved.

Mail delivery through PTC usual takes five to eight working days to reach its destination. The main reason for the delay is that PTC does not deliver mail to the camps because they lack PTC post offices. Neither are there any PTC agents deployed in these camps. Most army Formation/ Units lease postboxes from the nearest post office and it is from these postboxes that mail is collected. The frequency of mail collection depends on the availability of vehicles and the distance to the post office from the camp. Otherwise the frequency ranges from once to thrice per week.

The commercialization of PTC has further increased the postal charges for the army. The Corporation now demands the army to stamp on every letter posted instead of using the franking machine. By using the franking machine, the army was actually posting more letters than originally paid for. This new requirement of affixing stamps on each letter being posted has now greatly affected the army's postal service volume because fewer letters are being sent. As a way of increasing the volume of mail out, the

army has introduced dispatch riders. This is proving to be excessively expensive because of costs of fuel, wear and tear of vehicles and allowances paid drivers.

2. Electronic Mode of Communication

The army leases telephone and fax lines from PTC for its administrative communication system. The army is charged fixed monthly rates for the equipment and pays for each call made even if calls are made in the same geographical area. The PTC owns and maintains all the telephone equipment (handsets to switch boards) that the army uses. Only army supplies personnel to operate the equipment.

The army also operates telex machines for transmitting classified messages. These telex machines use special imported paper that is always in short supply. The use of these machines is limited and strictly controlled because of the shortage of paper.

3. Analysis

The army relies on PTC for all its administrative communication system. There is a danger that any industrial action by PTC employees will impair the army's daily administrative communication system. The army's administrative communication system efficiency cannot be greater than that of PTC, the sole suppliers of the army's communication facilities. Also the army relies on PTC facilities and technology for its internal business. The army is not in a position to conduct its own research on the best type of communication equipment suited to its needs. It is not cost effective for the army to continually maintain telex machines that are not being fully used.

III. LITERATURE REVIEW: INTRODUCTION TO INTRANET

A. BACKGROUND

Briefly, Internet started as the United States Department of Defense projects in the early 1960s. And ever since, Internet has proven to be very popular and powerful medium of communication, data transfer and electronic commerce. The Internet is increasing proportionately as the number of individuals and enterprise connected to the World Wide Web continues to grow. Many organizations are now defining their business strategies in relation to the electronic commerce that the Internet offers.

Intranets have now become the fast lane on the information highway for organizations in pursuit of the illusive technology edge. The Intranet technology is now replacing the telex as the most talked about method of information exchange within organizations.

While the mission of ZNA is not profit oriented, the organization seeks to improve on its communications. Timely and accurate information is an asset that can enhance mission accomplishment and support a warrior in the operational theater. If Intranets can deliver the efficiencies in the processes that support a mission, it can be assumed that the Intranets are a possible answer to the ZNA's administrative communication needs.

Because Intranet technology is still in its infancy, there are few studies so far that assesses its impact on organizations. This thesis introduces Intranet technology as a tool for communication and work-group collaboration that may be implemented by the ZNA for its administrative communication system. It also explores those organizational and

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cultural characteristics that support the implementation of an Intranet and those that may impede it.

B.   INTRODUCTION

What is *Intra*net? Some think that it is Internet misspelled or it is a mispronunciation of the word Internet. As defined by NASA, "*Intra*net is the internal Internet, or is simply defined as the structured use of Internet technologies to conduct business of an enterprise. It is an environment of network and computing tools based on those used in global network. This environment is completely owned by the enterprise and is generally not accessible from the Internet (Netscape white paper, 1996)."

Guengerich et al. (1994) defined Intranet as a Corporate network and business applications that run on it that shares "DNA" of Internet computing technologies (e.g., Internet Protocol, browser, Web servers) and exists behind a firewall. An Intranet is a secure internal, single organization implementation of the Internet.

An Intranet is a private network that uses the Transmission Control Protocol and Internet Protocol (TCP/IP) for its underlying transport. These protocols can run on a variety of network hardware and can also exist with other network protocols such as Internet Exchange Protocol (IXP). People from inside an Intranet can get at Internet resources, but those on the Internet cannot get into an Intranet (Grolla, 1996, p. 6).

C.   COMMUNICATION

Communication over the Intranets is made possible by transferring data files. These files may be graphic, text, video or audio. The text is the commonest file and is

presented in the Hypertext Markup Language (HTML). The files are usually stored on computers that are configured as Web servers that can be accessed by Hypertext Transport Protocol (HTTP). The data are transmitted from a source computer across multiple networks to destination computer through a set of rules called Internet Protocol (IP). (See Figure 1)
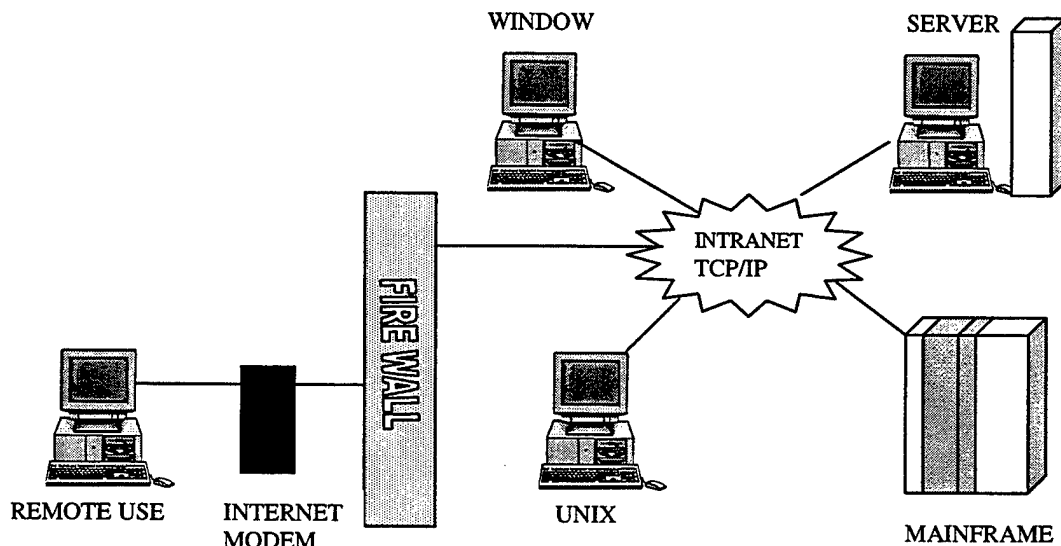
Figure 1: Intranet Communication Network

D.   INTRANET APPLICATIONS

Intranet is applicable in any organization ranging from military organizations to manufacturers. The earliest examples of companies with Intranet are those in defense and aerospace (McDonnell-Douglas, Boeing), pharmaceutical research, telecommunications and major Internet vendors (Silicon Graphics and Sun Microsystems).

Intranet is now widely used for customer service and management; for example Visa International has developed VisaInfo. During the summer of 1996, Visa connected

member banks to its Intranet. By so doing, Visa has now managed to eliminate about two million paper documents that the banks collectively transmitted to Visa.

E.   INTRANET COMPONENTS

An Intranet uses the client server model. There are two major components to every Intranet and these are: a Web Server (the server) and a Web Browser (the client).

1. Web Server

The Web server is an Intranet's hub. They are computers containing an Intranet's web pages and Hypertext Transfer Protocol (HTTP). The web server software was originally written at the European Laboratory for Particle Physics (CERN) and the National Center for Supercomputing Applications (NCSA). It is available for most computing platforms.

2. Web Browser

A web browser's primary function is to be the Intranet/Internet client, allowing users to navigate to different locations on the Intranet/Internet Hypertext Markup language documents and images to their client machines. Nowadays, browsers also can integrate other Internet-related functions including e-mail, newsgroups, chat, and File Transfer Protocol support, all using the same interface (DePompa, 1997, p38).

3. Transmission Control Protocol /Internet Protocol (TCP/IP)

The TCP/IP is a suite of related protocols developed by the U.S. Defense Department's Advanced Research Project Agency (DARPA) as part of a project on network interconnection that began in 1969. This is the most widely used protocol for interconnecting computers and is the protocol for Internet as well as for Intranet. DARPA

originally created TCP/IP to connect military networks, but later provided the protocol

standards to government and universities. (Strebe et al., 1997, p 213). The TCP/IP Suite

consists of;

- ♦ MIL-STD-1777 Internet Protocol (IP)- Provides a connectionless service to enable end systems to communicate across one or more networks. However this does not assume that the network is reliable.

- ♦ MIL-STD-1778 Transmission Control Protocol (TCP)- A reliable end to end data transfer service. This is equivalent to an Open Systems Interconnection (OSI) transfer protocol.

- ♦ MIL-STD-1780 File Transfer Protocol (FTP)-A simple application for file transfer of ASCII, EDCDIC, and binary files.

- ♦ MIL-STD-1781 Simple Mail Transfer Protocol (SMTP)- A simple electronic mail facility.

- ♦ MIL-STD-1782 TELNET-Provides a remote log-on facility for simple scroll-mode terminals (Stallings and Van Slyke, 1994, p. 430).

Since TCP/IP was free, universities quickly adopted it to connect their networks.

Many academicians collaborated to create higher level protocol for newsgroups, mail

transfer, printing, remote booting and even document browsing (Strebe et al 1997, p.

213). Then TCP/IP became the standard for inter-operating computers especially in the

military and university environments. With the development of the Hypertext Transfer

Protocol (HTTP) for sharing Hypertext Markup Language (HTML) documents freely on

the Internet was born and Internet use exploded in to private sector (Strebe et al 1997, p.

213).

TCP/IP offers many advantages. It is the most flexible transport protocol and is

routable over complex networks and provides more error correction than other protocols.

Every modern computer and operating system supports TCP/IP. Some of the its other

advantages include:

- ♦ Broad band connectivity among all types of computers and servers
- ♦ Direct access to the Internet
- ♦ Strong support for routing
- ♦ Simple Network Management Protocol.
- ♦ Support for other Internet protocols such as Post Office Protocol (POP) and Hypertext Transfer Protocol (HTTP). Centralized TCP/IP domain assignment to allow internetworking between organizations.

Disadvantages of TCP/IP

- ♦ Difficult to set up.
- ♦ Slower than Novell's IPX protocol or Microsoft's NetBEUI protocol.
- ♦ Centralized TCP/IP domain assignment requires registration and fees.
- ♦ Global expansion of Internet has seriously limited the availability of unique domain numbers.

F. INTRANET ARCHITECTURE

When designing an Intranet of an organization, it is not only important to understand what Intranet is and how it differs from Internet, but also, what Intranet services will best serve the organization. The Internet connects networks throughout the world via the Internet protocol. Whereas an Intranet is an internal, secure implementation of web technology as an organization's "network of networks". It also employs the IP-based technologies as well as non-IP technologies. The use of IP-based technologies leads to platform independence, which is the ability to share the same information using different applications on different platforms. By using IP-based protocols such as HTML, FTP, and others like SMTP documents can easily be shared by other computers that have different operating systems. The understanding of services that will best serve an organization requires an understanding of Intranet architecture. The Intranet framework can be thought of as consisting of various layers and modules. (See Figure 2).

Internet Architecture

Security	

Figure: Internet Architecture Diagram

Security
- Audit
- Authentication Integrity Encryption
- Authorization Access Control
- FireWall

Applications
- Packaged
- Customized

Service System
| Information Sharing | Database and Object Repository | Search Engines and Agents | Legacy Integrator Tools |
| Directory Services | Transaction Services | Collaboration & Workflow | |

Services   Platforms   Clients

Physical   Networks   Logical

Mgt. System
- Content Mgt.
- Service Mgt.
- System Mgt.
- Network Mgt.

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Figure 2: An Intranet Architecture Diagram.

(Brack, Reynolds, and Thomas, 1997).

G.   INTRANET BENEFITS

Having discussed Intranets uses in Chapter I, it is appropriate to discus the benefits derived from the using of them.   Intranets are becoming more popular in organizations because they are relatively easy to setup and use. Setting up an Intranet can be done in five basic steps namely:

♦ Getting Transmission Control Protocol/ Internet Protocol
♦ Setting up web server.
♦ Getting organized.
♦ Confront the Hypertext Markup Language (HTML).
♦ Link pages. (Ayres, 1996, pp151-158).

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Once this procedure is done, information is with graphics, sound and video is just a mouse click away. This also will allow everyone with any type of computer to access Intranet. As with many other information systems, Intranets benefits are both tangible and intangible.

1. Tangible Benefits of Intranets

♦ Fast and easy- (Most people can learn to use the web front end in a matter of few days compared with months for the existing tools).
♦ Save time.
♦ Connect and communicate among desperate platform.
♦ They are secure.
♦ Put users in control of their data.
♦ Harvestable- (Able to be taken, improved and used by others).
♦ Cheap to implement.
♦ Noninvasive -(Do not require replacement of any part of the existing IT.
♦ Infrastructure.
♦ Scaleable.
♦ Leverage your infrastructure and applications investment.

2. Intangible Benefits of Intranets

♦ Provide access to accurate information.
♦ Provide better communication system.
♦ Provide better coordination.
♦ Support on-line forms, data entry and interactive communication.
♦ Provides operational efficiency. (Miller and McDonald, 1996, pp.24-25)
♦ Provide for creativity and innovation.

H. INTRANET ADVANTAGES

The rise in popularity of *Intr*anet is based on three advantages: speed, reliability and scalability. These advantages were fundamental to the rise of Transmission Control Protocol/Internet Protocol (TCP/IP) as the domain protocol of Internet. *Intra*nets can offer several advantages to organizations that are willing to implement them.

1. Ease of Use

The user friendliness of Intranets can be largely attributed to the intuitive user interface. Navigation and information retrieval can be accomplished through a point and click interface. This simple interface makes information available and accessible to end users of any experience level. This reduces the amount of training necessary for the beginners.

In recent years, Intranet developers have expanded the concept of user friendly interface to capture a particular motif such as newspapers. Employees can log in every morning to find the day's top headlines about their organization activities and events. (Buckler, 1996). More information is easily made available to these employees with much less effort.

Another organization's Intranet is designed for amusement. The home page takes the form of a refrigerator door with several refrigerator magnets. Each magnet is a link to web page of a division. Those home pages contain press releases, product announcements, new project initiatives and program schedules. The use of themes in these examples shows the intuitive nature of the interface.

2. Pull and Push Approach

Intranets are designed to give the end user power to select and control the amount and type of information received. An end-user has the latitude to access information necessary to his/her needs. Not all information published on the Web may be useful to end-users. End-users therefore, select what is relevant to them. This is a shift from the traditional method of information distribution (Holtz 1996).

Schulumberger Ltd., with more than 51,000 employees, uses the concept of pull and push. The chief Information Office (CIO) designed the Intranet to be self-service to company employees. For example, a firm posts information about employees' expertise on its Intranet. Employees are responsible for publishing information about their special qualifications on the Intranet.

3. Consistency of Information

As a central point for communication, data transfer and collaboration, Intranets free organizations from traditional information exchange problems. Instead of storing information in several formats, locations and media, information can be presented in standardized format and can be published from the central site. This allows the information to be updated easily. It also makes the task of dealing with sensitive information more manageable and easily controllable.

In a study conducted by Hewlett-Packard, the company found that the use of Intranet has eliminated thousands of pages of printed internal policy manuals, sales literature production information and news releases by placing them on the line. As a result, employees are no longer maintaining large binders that may not be current.

Intranets' ability to aid in the management of consistency of information is found mostly in of training. Intranets help reduce the cost of training by eliminating the need for printed manuals and replacing training manuals with CD-ROM. Thus Intranets have the potential of eliminating most problems associated with the traditional methods of supplying training with printed materials.

4. Just-In-Time Information

Sensitive is perishable and must be used timelessly. Intranets are capable of transmitting information just by the click of a button, a document of 100 or more pages can be sent to any destination instantly. Therefore, Intranets may play a role of in ensuring that the rewards of using time sensitive information are not lost.

A study conducted by Info-World, revealed that organizations dealing with sensitive information are likely to adopt the use of Intranet. The reason in a larger organization, is slower to disseminate and react to changes of information with the traditional methods of communication. Hence many large organizations are now investing in Intranets because the employees need just-in-time access to perishable information.

5. Low Cost

The Gartner Group (1997) estimated that the total cost for a small operating system Windows 3.1 is $54 000 over a five-year period. About 85% of the costs are attributed to the labor involved in administration, updates, management and changes and support. Costs will increase, however, if an organization uses a variety of systems.

Also, the costs of implementing Intranets will increase if there are no network infrastructure. But on the assumption that an organization has the wiring, software makes the initial cost (buy-in cost) relatively lower than that of any other technology (Millikin 1996).

In addition to lower initial costs Intranets also offer possibilities for cheaper operational costs relative to other alternatives. First, all client computers can communicate with the same protocol thus eliminating the need for different server

software for each system. Second, only one type of software of the web browser that needs to be installed in each computer. The third point is that computers can be scaled down, to what is referred as "thin client" and allow the network servers to handle most of the computing. Lastly, updates, patches and the distribution of new releases can be conducted via the web reducing the time cost of system administration (Horwitt 1996)

Although the nature of Intranets and their applications make it difficult to specifically quantify direct benefit is paper costs. There is also reduction in use amount of paper printing, stamps, and copying will translate into direct reduction in expenses of the organization.

6. Technical Flexibility

Organizations continue to implement Intranets because of high flexibility they offer (Milliken, 1996). The use a common protocol like TCP/IP offers Intranets the capability of networking and platforms that are diverse in terms of hardware and software. Also, machines using entirely different operating systems (Unix vs DOS) can successfully network via Intranets. This offers a temporary solution to organizations using different systems. Also Intranets can be implemented on top of network infrastructure that that is currently in use. In other words, an organization can use the topology already available in copper, fiber or coax. Intranets can also be used to extend the life of previous generation information technology commonly known as legacy systems.

I.   DISADVANTAGES OF INTRANETS

Despite many advantages offered by Intranets, the literature also suggests that they have some limitations.

1. Information Overload

One of Intranet's greatest strength is arguably the unprecedented ability it offers organizational members to share information. The power of the Intranet lies in the vast amounts of information that can be on the Web. (Holtz, 1996). However it becomes increasingly difficult to find the resources needed with so many users now placing large quantities of information on the Intranet. The other concern is that with much information spread across many servers, end-users may become frustrated in accessing the information and give up the search. However search engines, such as those used on the Internet may be employed. They offer only a partial solution to the problem. They do not prevent an end-user from becoming lost, confused and eventually giving up search.

2. Centralization VS. Decentralization

The Intranet tends to break down the traditional organizational structure by its emphasis on open communication collaboration and knowledge management. Also the Intranet introduces the dimension of graphic design that requires skills other than programming. Since the key characteristic of its technology is the ability to shift the control of information flow from creators to users, the biggest challenge is to change from the attitude of control to the attitude of enabling independent decisions and actions. This also calls for not only a change in attitude but also a shift of organizational culture.

3. Misuse of Technology

The Intranet does not have the potential to increase productivity. Whether the technology lives to its billing depends on how it is used. The fact that internal webs are

connected to the Internet brings another big challenge to Intranet implementers. Employers are now finding that the wealth of information readily available on the Internet is becoming a cause of concern. Employees tend to spend more valuable time surfacing the Web sites that are not related to the mission or activities of the organization. Leisure, sport, entertainment and interactive games are now tempting Web sites that detract employees attention and hinder production in an organization (Muhammad, 1996).

Nielsen Media Research and Muhammad, (1996) found that IBM employees misused their Internet connection more than five thousand times per month. Other companies with similar problems are Apple Computer, AT&T and Hewlett Packard.

Despite policy measures put in place by organizations regarding the use of Internet connections, it is difficult to enforce those policies. It is difficult to tell whether an employee is surfing a non-work-related site (Muhammad, 1996). To handle this challenge, software developers have begun to design programs that allow organizations to censor the web sites accessed to make certain that they are work related. This can be done in two ways, monitoring and blocking. A monitoring scheme allows management to track the sites that the user has visited and record time spent on each site. Blocking restricts access to specified sites.

J.   IMPLEMENTING CONCERNS

Having a basic working knowledge of the advantages, and challenges of Intranets is necessary but not sufficient to determine whether an Intranet will succeed. There are other issues that an organization must consider before engaging Intranet technology. The

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issues vary with the type of the organization and its situation. It is possible to consider set of points to consider that may help the successful implementation of Intranet.

1. Security

The introduction and implementation of Intranet brings security problems. Organizations have to consider the protection and preservation of the information contained in the network as well as the network itself. The situation becomes even more complex if outsiders, vendors and partners access the network (Hosteller, 1996). However, there is concern that security breaches are originated from within an organization (Paone, 1996). Cobb (1996) estimated that 75% of security breaches emanate from within the organization. However there is enough room for the improvement to prevent internal security breaches.

Networks can be protected from outside interference with a firewall. A firewall is a computer; router or a combination of these components with software that allows managers to control accesses to an Intranet. The firewall is a central point through which all inbound and outbound traffic must pass. Controlling and management of the network is conducted from this point.

2. Control

Control is highly dependent on organizational culture. With the ability of a desktop computer to operate as a Web server, organizations are faced with the problems associated with the growth of Intranets (Millikin, 1996). Some organizations are concerned that employees might post confidential information on an Intranet (Salamone, 19966).

3. Training

It is essential that training of end-users on new platforms and systems must be done as it is the integral part of the IS development plan. However, Intranets are renowned for being easy to use and subsequently have low training costs (Horwitt, 1996). But contemplating costs of training is important as well as ensuring that end users maximize the use of tools at hand is also essential for the success of an Intranet (Millikin, 1996).

4. Management

The management of an Intranet involves issues that include the distribution of tools, installation of software, maintenance of the system and control of the web-based network (Millikin, 1996). An attraction of features of an Intranet is its ability to do the management from a single centralized position. Nevertheless, Intranet management can be cumbersome because the necessary tools to perform the management tasks is still forthcoming. Tools that allow management to increase usage, measure performance or for troubleshooting are not available.

IV.   INTRANET IMPLEMENTING ISSUES

A.   INTRODUCTION

The term implementation refers to more than the simple connection of computers and hardware via network cabling. Implementation is a process that includes all actions necessary to develop, design, install and maintain an information system. In a typical system's development life cycle (SDLC) diagram (Figure 3), implementation often refers to one of the latter phases. In this diagram, taken from Kendall and Kendall's book, (System Analysis and Design), it is the last phase. For the purposes of this thesis, the term implementation covers all phases of system's life cycle.

1 Identifying Problems, Opportunities, and Objective	2 Determining Information Requirements	3 Analyzing Systems Needs
7 Implementing and Evaluating		4 Designing Required System
6 Testing and Maintaining the System		5 Developing and Documenting Software
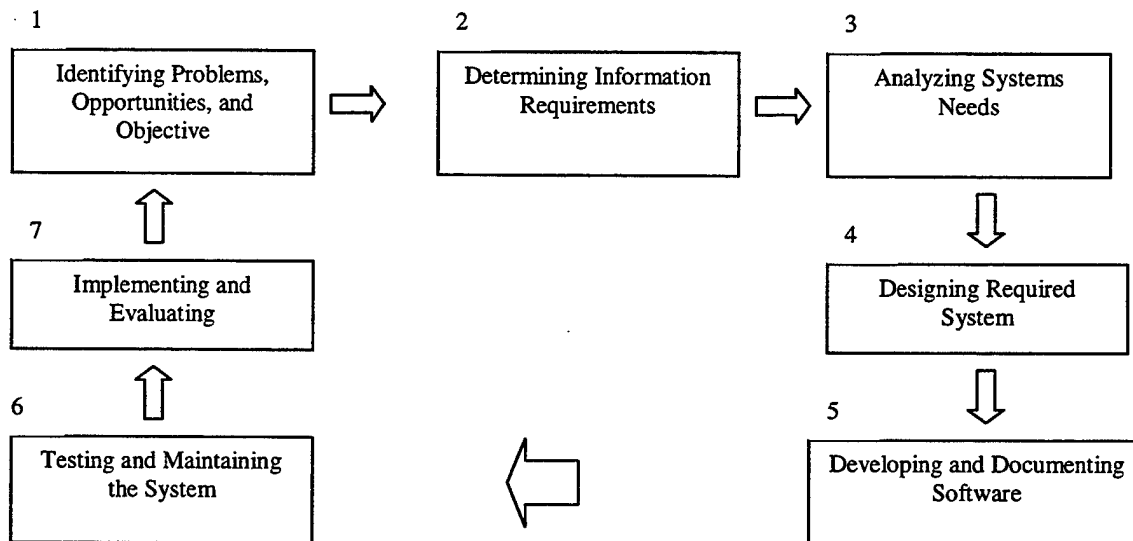
Figure 3: SEVEN PHASES OF SYSTEMS DEVELOPMENT LIFE CYCLE.

(From Kendall and Kendall's book)

The Zimbabwe National Army is has six levels of command and three major (branches) (1) general, (2) administration and (3) logistics. Each branch sponsors two or more directorates (See Figures 3 and 4). Since each level and department of the

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organization has different function. Hence each will have different approach to implementation of information system. Every department/branch therefore, should have its own LAN/WAN and server. This applies to Brigades and directorates as well.

For the daily routine work, mail exchange, publishing of orders, postings and promotions and sick returns departmental Internet-services should be provided. And any correspondences that are classified must be separated from the networks and access strictly controlled. For logistic departments and units, an electronic data exchange (EDI) should be installed for easy data control and capture. The EDI should be considered for installation in the following areas:

- Ammunition depots
- Armories
- Technical stores
- Ration and clothing stores
- Army fuel stations/points.
- Workshops
- Referral and Camp hospitals
- Clothing factory.

The benefits that Intranets offer are discussed in chapter two. With an Intranet, users can dissolve barriers of communication by using universal browsers to perform the following tasks:

- Carry out issues and demands on the Intranet.
- View and interact with multi-media presentations.
- View documents created on a variety of platforms.
- Carry out inter-departmental audit and stocktaking on the Intranet.

Figures 3 and 4 show how Intranet could be implemented. Figure 3 shows the implementation at Ministry of Defense and Figure 4 the implementation within ZNA.

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                        ┌─────────────────────────┐
                        │   MINISTER OF DEFENSE   │
                        └─────────────┬───────────┘
                                      │
        ┌─────────────────────┐       │       ┌─────────────────────────┐
        │ COMMANDER DEFENSE.  ├───────┼───────┤  SECRETARY FOR DEFENSE  │
        │       FORCES        │       │       │                         │
        └─────────────────────┘       │       └─────────────────────────┘
                                      │
   ┌──────────────┬───────────────────┴───────────────────┬──────────────┐
┌──┴───────┐  ┌───┴───────────────┐              ┌─────────┴──────────┐
│   COS.   │  │      COS.         │              │    COMMANDANT      │
│OPERATIONS│  │ ADMIN&LOGISTICS.  │              │       (ZSC)        │
└──────────┘  └───────────────────┘              └────────────────────┘
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DIR. OPERATIONS	DIR PLANS	DIR PERSONNEL	DIR FINANCE
DIR INTELLIGENCE	DIR TRAINING	DIR EQUIPMENT	DIR HOUSING
DIR R&D.	DIR PROTOCOL.	DIR. COMBAT SUPPLIES	DIR TPT
DIR PUBLIC RELATIONS			

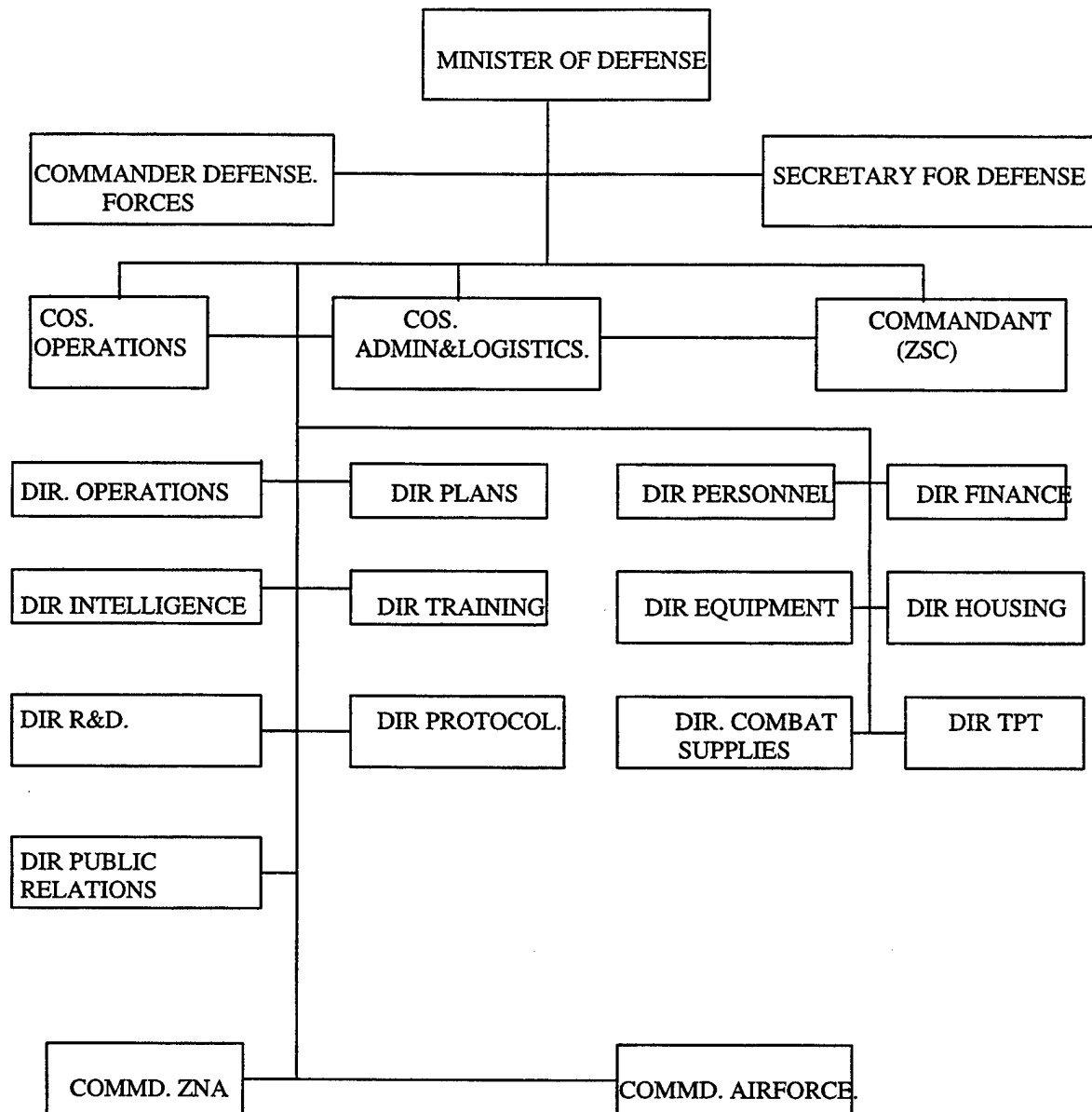| COMMD. ZNA | COMMD. AIRFORCE. |

Figure 4: Organization of ZDF (Chain of Command) Diagram
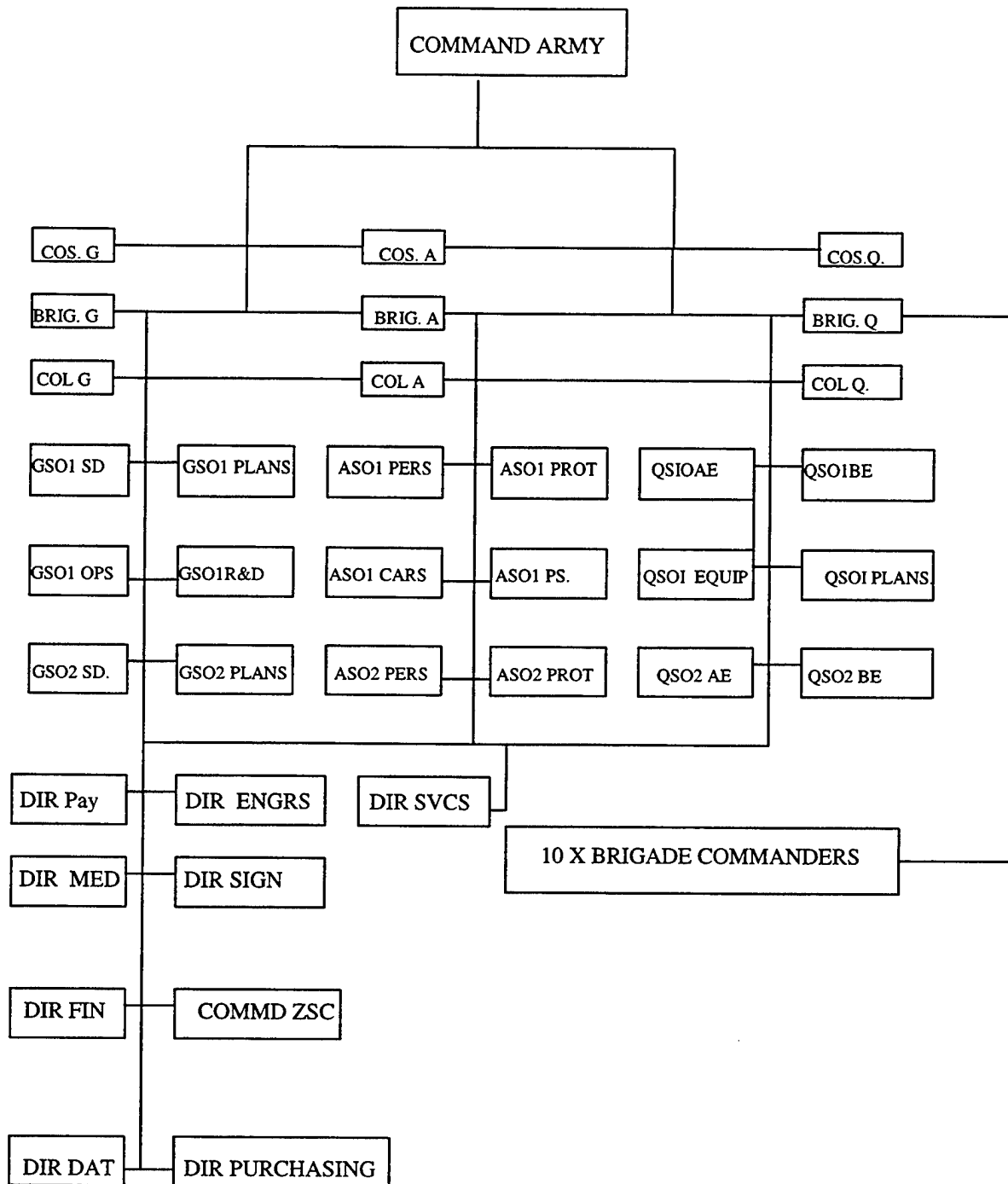
Figure 5: Organization Of ZNA (Chain of command) Diagram.

B.   ORGANIZATIONAL STRATEGIC PLANNING AND GOAL SETTING

The main aim of effectiveness of Intranet implementation is to improve on the overall communication system within ZNA. Hence the organization should have top priority and objectives. The organizational overall strategy should be translated into network plan. The network plan should encompass long and short term plans as technology is always evolving. Hence, there can be no single time investment.

A short-term plan should focus on the main functions that support the organizational administrative operations. It should be of three to four year's duration. Intranet plans and growth should match the organizational development and the ever-emerging technology. Long-term plans should look at the future organizational expansion/reduction and improvement of quality of service. Generally, a long-term plan focuses on a period of ten years and over. Both plans should be continuously reviewed and adjusted accordingly.

C.   DESIGN REQUIREMENTS

The organizational requirements must be clear and simple. Possibly, they must be expressed in terms of percentages. For example, Internet reliability must be 99%, or the remote query must have ten or less seconds' response time.

All requirements should be prioritized into three levels, (1) must have, (2) desirable to have, and (3) may have. (Fitzgerald, 1996). Implementation of these levels must be according to functions and budget restrictions.

Before any attempt of wider range of implementation, a prototype system must be put in place. This will help forecasting potential conversion difficulties and evaluate the interaction of the existing data formats with the new delivery mechanisms.

V. METHODOLOGY

A quantitative approach was used to obtain data for this thesis. Though this approach directs the researcher to what has been done, it rarely explains why something was done. The quantitative method has been determined to be the best method to answer questions related to the methods, aspects of Intranet implementation as well as more abstract issues involving organizational culture and socio-political environment.

A. POPULATION SAMPLE

An assumption of this research is that the introduction of an Intranet is similar to the introduction of any other information system in the organization. With this assumption in mind, the population was identified as senior army officers with experience in army communication systems administration and procurement. Some of the individuals selected to participated in the research are former students of Naval Postgraduate School.

B. DATA COLLECTION

The author intended to apply a questionnaire as the principal method of collecting data for this thesis. Due to circumstances beyond his control, he had to resort to telephone interviews as the use of questionnaire was derailed somewhere on the line. Apart from the telephone interviews that were conducted, other sources of information gathering include Internet, magazines books etc. As a result, much smaller population sample was interviewed and there was heavy reliance on these other sources of information.

VI. INTRANET IMPLEMENTING PROCEDURES

A. GAINING LEADERSHIP BUY-IN

Most of the interviewees pointed out that it is very important to get support from leadership in order to ensure successful introduction and implementation of Intranet. The major reason is that ZNA is a public organization that operates stringent budgetary constraints in a turbulent political environment. Failure to address leadership buy in has the potential to damage chances of favorable reception

N of the Intranet idea. The major points that must be considered in this phase are; (1) definition of organizational limits, (2) external stakeholders, (3) acquisition rules and regulations, (4) change management and (5) portable organizations.

Organizational limits deal with difficult in deciding where the boundaries of organization should lie. External stakeholders are those external forces that may block or hinder Intranet implementation. Acquisition rules and regulations are those considerations that focus on constraints placed on the implementers by national laws and regulations governing the procurement of equipment within ZNA. A change in management is the consideration that acknowledges the difficult in administering a large-scale organization. Lastly, portable organizations address concerns of organizations that are required to move or relocate to remote sites in order to fulfill their duties.

1. Organizational Limit

To gain leadership buy-in, most interviewees stressed that implementers must start by determining the state of organization's existing infrastructure. Then, during the process, call for implementers to find applications that would improve ways of doing

business. These two points were made on the assumption that the implementers could accomplish for the entire organization.

The ZNA Intranet is most likely to resemble an Internet, with several independent networks connected together. This fact therefore creates a special consideration for implementers. They must accurately determine the limits of their organization's Intranets. For a smaller organization, this does not present much difficult task, but for larger organization, this may be daunting and very intimidating challenge. It is even becoming more complex as organizations are becoming closely interdependent.

Many private service-provider companies (AT&T merging with TCI in cable TV 1998) are developing partnership to gain competitive edge and meet market demands. The push for "jointness" between ZNA and Air Force of Zimbabwe AFZ (1997) is creating air of interdependence between these two military branches. The use of information technology is serving as an enabler for both private and public organizations that have recognized the value of interdependence.

The implementers can not begin to access existing infrastructure or successfully complete any other activity in the first phase without a firm notion of where the organization starts or ends. ZNA is a large organization with hundreds of subordinate commands and agencies, all intertwined. Hence, boundary definition is a special consideration because drawing boundaries within ZNA alone will not be complete and is hard to do, and yet, it is necessary task to the management of an Intranet. The structure of ZNA is quasi matrix, comprising of operational, administrative and logistic chain of commands. At the low level, such as platoon, the boundaries can be drawn at the confinements of individual commands. But beyond this level, in chain of command, the

complexity grows exponentially. A good example is the Construction Regiment, it is both operational as well as a logistic unit. It boundaries are not well defined. This example illustrates that in ZNA, organizations can be part of several superior organizations at the same time. Thus, they may be required to share information in several different formats with many different entities.

Focusing on the organization's mission statement can solve the problem of boundary identification. The implementers must decide on how an Intranet will impact on the mission and what other units/sub-units must be linked. The implementers must build flexibility to allow their Intranet to evolve and meet changing needs and shifting of boundaries.

2. External Stakeholders

In most private organizations, the process of gaining leadership's acceptance and commitment and the approval authority usually rests in an individual either CEO or GM. But in a public organization like ZNA, there are several organizations that have interest in how ZNA projects are funded and managed. Organizations such as the Government Tender Board (GTB), Government Tenders Committee (GTC) is responsible for approving purchases for any government department.

This creates a special consideration for Intranet implementers because these external stakeholders have the power to block some of the projects. These external stakeholders exercise their power by approving and signing contracts. It is not possible that ZNA could implement an Intranet without the blessing of these external stakeholders. Other external stakeholders would be the politicians who would like to know which country is supplying the technology. The equipment has to be imported

from a country that the politicians approve of. There is a danger that the best information equipment might not be available from the country of their choice.

3. Acquisition Rules and Regulations

Like any other government department, ZNA Intranet implementers must follow the GTC laid down procedures. The forerunner of all the rules and regulation is to supply GTC with specifications of equipment to be purchased. This is likely to cause problems, as Intranet software specification suitable for ZNA is not readily available on the open market. Software developers will only develop customer-designed software after being assured that the customer will purchase the software.

It is therefore important for Intranet implementers to discuss these issues with the relevant people before any acquisition initiation is done.

4. Change Management

One other challenge that Intranet implementers are likely to face apart from leadership buy-in is getting others in the organization to accept the new concept. It is not only challenging at the initial stage but throughout the process of implementing. Some of the interviewees raised their frustration of attempting to change (the "status quo") the way bureaucratic organizations view information. They indicated that in most hierarchical organizations information is power and many members would be reluctant to relinquish it. Most of the interviewees fear a possibility of loss of military discipline.

In response to the challenge, the interviewees suggested several solutions. One is to develop a team of implementers from Signals Directorate (army communication directorate) and army data processing unit (ADPU). Such recommendation is affirmed by the work of change management theorists that suggest that one way to facilitate

change in a bureaucratic organization is through use of independent groups. The groups are called parallel learning structures. These are coordinated groups that work together to develop solutions and implement new thoughts or ideas (Bushe and Shani, 1991). These groups are intended to facilitate organizational learning and operate in parallel with the hierarchy. One major advantage of incorporating this theory along with the implementing model is that it provides participation from all levels of the organization.

5. Portable Organizations

The Zimbabwe National Army is a unique organization that is required to deploy either internally or externally. There are very few private organizations that can deploy. Their notion of portable organization does not exist; instead they are only concerned with remote access through dial-up connections. While remote access requirement does not pause as a challenge, it does not compare with challenges associated with building an Intranet that is portable.

A portable organization should be a special consideration for implementers because it is most likely that commanders of mobile units will want the services of a mobile system to support operations wherever they are deployed. If an Intranet proves to be effective in camp, then certainly users will want to use that same means of communications in any place they are deployed. Hence Intranet implementers must decide if systems they design are supposed to be immobile platforms capable of meeting communication needs of the organization wherever it is deployed.

One possible solution is to design a portable network. An organization can simply transport all its computers, software and the peripheral equipment to the deployed

position. This also calls for the supply of generators or tapping of solar energy to power the machines.

B. BASIC INTRANET APPLICATIONS

The introduction and implementation of Intranet may realize the concept of paper-less (at least reduction of use of paper) business environment for ZNA. This may be significant reduction of administrative costs for the army. Web-based applications have the ability to improve on internal communication by making the users more efficient and productive. There are many Intranet applications that can be developed by an organization to improve on information flow.

1. Publishing Organization Documents

The Zona Research Study Profiles (1997) concluded that information publishing is the top application for an Intranet computing. The most popular information is that created by employee for other employees. Just by the click of a mouse, users can automatically post and share information on the organization network thereby creating an environment for employee collaboration. The documents that could be on the Intranet may include, newsletters, annual reports, organization facilities such as hotels and many more.

2. Internal Searchable Directories

The entire ZNA internal directory can be mirrored on the Web site via Common Gateway Interface scripts. The web server can serve as the gateway to back-end, pre-existing or new applications. The information can be made more widely available and

can also be easily updated whenever there are any postings. There is no waste of paper because everything is done electronically. There is no paper involvement.

3. Electronic Mail

The implementation of an Intranet will call for an automatic introduction of e-mail products with standard and simple methods of attachment of documents. With time, e-mail is about to be pushed as the defacto method of communication. This method offers an instant communication unlike the postal system that may take days or weeks before it reaches its final destination.

4. Organization/Departmental Pages

Within an organization, each department has its own specific function. Intranet technology offers the ideal medium for interdepartmental communication. The search engines will provide any individuals with the necessary tools to search for department with answers to many questions that arise on daily basis.

C. POTENTIAL INTRANET APPLICATIONS FOR ZNA

1. Event Calendar

Instead of distributing memoranda and posting of notices on boards, the Intranet will provide ZNA employees with on line daily activity schedules. This is the fastest way of communicating whenever there are any changes made to the schedules. Apart from offering instant communication, the use of paper will be reduced there by reducing administrative costs to the organization.

2. Requisition and Leave Request Forms

The end-users will submit either stores or leave request forms on line. The stores managers can then confirm the stores availability/non-availability on the line. The end-user will therefore do not incur any unnecessary costs of traveling to submit the request forms. Costs are cut costs in that only one entry is done on line as compared to submitting forms in quadruplicate. By the same principle, many standard request forms can be transferred from printed paper to documents to on line web forms. These forms will be designed in such a way that each form is immediately routed to the proper office, for control and auditing purposes.

3. On Line Staff Handbook

There is a need to have information readily available for new staff joining the organization. The new employees need to find information on operating procedures (SOPS), military discipline, training manuals, leave regulations, promotion procedures, training requirements, responsibilities and benefits as soon as they come aboard.

By putting all this information on line, firstly, it simplifies and encourages new members to go through the whole procedure. Secondly it cuts costs on printing as well as paper costs. Thirdly it is easy to update and there is no wastage since there is no paper work involved.

4. The Commander ZNA Corner

This will be the best way to introduce Intranet in ZNA if the Commander's corner is established. Once this in place, the Commander will be able to communicate his vision with much easiness to his subordinates. This will also help the Commander to manage by

"wandering along," as he will be able to access his office whilst he is at any location within the organization.

5. The Phone and E-mail Directory

The directory will include all names of key personnel in the organization and will be a live document. This will not become obsolete, as it will be continuously be updated. The directory will also include all the names of people, offices and other public information that is considered necessary. The e-mail directory portion will be in hypertext format. By utilizing the search engine, employees can easily access the person that wants to communicate with. Clicking on the individual's name will automatically generate the mail to header of a message to be sent.

D. CHANGE READINESS

Before implementing any major change, an assessment of the organization's readiness for change must be conducted. Any successfully change requires that change be consistent with overall organizational mission, objectives and must meet the needs of the stakeholders. It must also be embraced by all those affected. For successful change to take place, the organizational readiness for change must be greater than the marginal cost to implement it. The change readiness can be considered to have three components: (1) the level of employee dissatisfaction with the status quo, (2) the organization's change culture, and (3) the strategy used to implement change. The marginal cost has two components cost of change and cost of not changing.

1. Dissatisfaction

The motivation for change is driven by the loss of confidence in the current prevailing conditions, the status quo (Beer, 1988). The loss of confidence can be attributed to both external and internal environmental changes that are not met with adequate organizational adaptation. The environmental changes may include but not only limited to technological, market conditions, changes in personnel and sometimes innovation. The challenge now is not creating change but adapting to change since change is itself is constant.

The ZNA employees tend to be very enthusiastic, energetic, frustrated and skeptical about change. When employees are enthusiastic and energetic, they see the potential growth and improvement for themselves and the organization, keeping up to date with current technology and trends and also feel they add value to the organization. They become frustrated, skeptical when there is no sign for any change.

The employees of ZNA have reached a level of frustration and dissatisfaction because of the lack of efficient and effective modes of communication. Information is becoming difficult to obtain and is only readily available to those units closer to big towns. "Information is only for those who know where to get it," one interviewee exclaimed. "I got orders to attend AIDS seminar a day after it had started," the second interviewee said.

Other additional sources of frustration emanate from lack of understanding of how business is conducted within the organization. There is no adequate current material concerning the organization in circulation. Also some employees feel they are being "held back" from exploring new ideas whilst others feel they are being over worked.

There are some employees who are advocating for change while others feel it is futile to try anything. Therefore, ZNA seems to be oscillating in area of tolerable conflict where attempts to leverage technology are stifled by culture opposed to change. This high level of dissatisfaction with the status quo that is brewing within ZNA is a strong indication that it is the right time for change.

2. Culture

The cultural predisposition is the second component change formula. Some organizational cultures adapt more readily than others do. These cultures tend to have evolved into learning organizations where systems thinking is the norm, personal mastery is encouraged, mental models are challenged, shared visions are crated and team learning is valued (Senge, 1994, pp. 5-10).

Culturally, ZNA does not rate highly on the change readiness scale. Departments operate on their own agendas with minimum consideration of the overall mission or vision of the organization. Only those driven beyond the organizational expectations achieve personal mastery. The organization is fully entrenched with mental models of what can and can not be done and how things should be done. In some instances, shared visions are often stifled and teamwork is evident only on specific projects. Such instances do not provide the organization with room for change.

The organization is currently going under restructuring process, which is being implemented from top to bottom. The office of Commander Defense Forces has just been established at the Ministry of Defense. This unsettling is therefore creating an excellent opportunity the implementation of Intranet. The sole purpose of restructuring is to improve communication and information sharing within and between departments.

Intranet is capable of doing that. At present, the organization is placed on neutral zone. A neutral zone is that place in time where the organization is no longer what it was, and is not yet what it is hoping it should be. It is at this neutral zone that people and organizations have the time to be creative (Bridges, 1993, p 61). This is the right time for ZNA to use Intranet as a tool to redefine the organization and culture for optimum information sharing.

The other cultural aspect that might impede the introduction and implementation of an Intranet is that the Zimbabwe National Army is that the organization is a portable organization. A portable organization has been discussed before in this chapter and is not to discuss further.

3. Process

A process of change is the sequence of events that take place in the organization from the present state, through the transition period to the desired future state. The process is the key to the success of Intranet implementation and also obtaining user buy-ins for the change. Irrespective of whether the change is from top to bottom or bottom up, commitment to change by stakeholders is the most important element for success.

The change that is viewed by employees to be in their interest is change they will support. The factors in change process that may influence employee's commitment to change may vary from who decides what to change, and how the change is to be implemented ecetra. The employee buy-in can be achieved trough the employee participation in the entire change process, that is from initiation to implementation.

However, change in any organization is likely to meet four basic elements of some resistance from employees. These are: (1) individual tolerance for change, (2)

personal sense of security, (3) extent of loyalty, and (4) cultural beliefs and experiences. These elements all affect how individuals will react to change (Bryant, 1979).

The resistance to change, in relation to the introduction and implementation of an Intranet that exists in ZNA may be attributed to historical experience with past failed projects. Some employees, who have been with the organization since the amalgamation of the three armies in 1983, have become accustomed and are comfortable with how business is conducted. One interviewee asked, "Why computers now after 19 of independence years?" Another remarked, "it does not matter as long as the message reaches its final destination, after all during the guerrilla war we never used these gadgets you are now suggesting." Despite the fact that most employees support the introduction and implementation of an Intranet, they are skeptical about the support an Intranet might get from very top management. The general belief is that there is no top management buy-in for software in general and without the top management blessings, Intranet can not be successfully implemented. Another factor of concern, as one interviewee remarked, "It will never be maintained as other projects are."

E.   COSTS

1. Assumptions

For any change to be effected, it is important to remember that the change process carries with it both the technical and social costs. The technical costs involve quantifiable resources; money and labor hours. Socially, cost change is very complex and is generally not quantifiable. When determining the costs of implementing the Intranets in the Zimbabwe National Army, the author assumes that the new computer that

would be acquired would be used as the main network center. It will then be linked to various desktops. Or the existing mainframe should be installed with Microsoft Windows NT4.0 Server and Microsoft Office 98 to facilitate communication. The author also assumes that the army would acquire PCs with Microsoft Windows NT 4.0 and Office 98.

2. Incremental Costs

The following software requirements ate provided in the Microsoft Windows NT4.0 and Office98. Hence, they do not represent any incremental cost. These are:

(a). The Web Server: Microsoft IIS web server is bundled with Microsoft Windows NT4.0

(b). The Browser: Microsoft Internet Explorer web browser is bundled with also Microsoft Windows NT 4.0

(c). Web Publishing Tools: The capability to save documents, as HTML is a function that is also included in the Microsoft Word 98. The ability to design web pages is provided by Microsoft front-page web design, which is bundled with Microsoft NT 4.0.

(d). The Router: It is not yet clear as to whether or not the army Intranet would include Internet connectivity, the router may or may not be a marginal cost with regard implementation decision. If however, the need for router arises, a high quality router would be ideal. The minimum cost for high quality router is in the region of $4 000. In addition to the router, a CSU/DSU must also be purchased. However, the service providers generally will advise accordingly as to what type of a CSU/DSU is suitable (Software, Inc., 1997).

The total approximate cost of purchasing computers, monitors and satellite dishes is approximately $393,570.00. In addition to this is there is cost of cabling and labor. The price of cables varies with the type of cable used and the distance covered. There are also monthly maintenance costs to be considered.

VII. CONCLUSIONS

A. SUMMARY

Intranets, the internal networks based on the same Internet technology and protocol have since 1994 emerged as very popular medium for communication and information exchange within organizations. In order to enhance, preserve and maintain their market share, many organizations are now turning to the use of Intranet. Also Intranet is becoming prominent in schools, universities and libraries throughout the world. Although the mission of the Zimbabwe National Army is not focused on profit making, it however does seek to enhance its communication system. The purpose of the thesis is to introduce and recommend to ZNA the implementation of Intranet as a communication medium in the organization's administrative system.

The research was conducted on the assumption that the introduction of Intranet is similar to any other information system that was previously acquired. Hence, a sample of senior army officers with experience in communications, purchasing of army equipment and management were interviewed.

From the interviews that were conducted, it was revealed that the process of Intranet implementation is heavily dependent on three basic variables. These are organizational culture, structure and the size of the organization. And, the process would be composed of four phases that include, leadership buy-in, the introduction of the prototype, attainment of critical mass and the Intranet final refinement.

On analyzing the interviews, there are special points that are associated with the implementation process that ZNA Intranet implementers must consider. The implementers must consider the following points:

Consider both internal and external stakeholders and policies that may have negative impact on the implementation of the Intranet.

Ensure that the implementation plans incorporate setbacks caused by acquisition rules and regulations.

Precisely understand and define the limits and boundaries of the Intranet.

Fully comprehend the security needs of the organization before the implementation of Intranet. They should also make informed decisions about connecting to the Internet or other networks.

Plan changes should center on personnel to ensure successful implementation of the project.

Establish policy that ensures that the end users fully understand their responsibilities in relation to chain of command and standards of conduct.

In conclusion the author sought to answer the following questions: in what way would Intranet enhance ZNA communication system, what are the quantifiable costs and budgets, what organizational elements or culture that may impede adoption of an Intranet and what is the state of electronic communication within ZNA.

Most of the interviewees predicted that Intranets would offer instant communication throughout the organization unlike other modes of communications currently in use. It takes about four to six days for a letter to arrive at its final destination where as e-mail only takes few seconds (only a mouse click). Also they cited that communication within the organization is seriously affected each time PTC employees take industrial. The main reasons being those PTC facilities and services are the only channels through which the army conducts most of its administrative communications.

Intranets will therefore offer independent modes of administrative communication system.

Most of the interviewees cited that implementation of Intranets is dependent of the size of the organization, organizational culture and structure. Also resistance to change for fear of the unknown is another factor that may affect Intranet implementation in the organization. The costs of procurement and monthly maintenance expenses are cited as some of the other factors that may hinder the implementation of Intranets.

B. LIMITATIONS OF STUDY

Despite that the topic was thoroughly researched, the interviewees had no in depth experience in the field of Management Information System. This, in itself is a limitation to the study. Another limitation is that originally designed questionnaire could not be administered due to the circumstances beyond the control of the author. As a result, the author had to conduct telephone interviews. Although telephone interviews are recommended as means of information gathering, they may not be as effective as questionnaires.

The timing of the research is significant to the relevance of the information presented. Information that is relevant today can easily be considered irrelevant and obsolete in a matter of days due to the pace with which technology is changing.

The sample size is another limitation because a larger sample could possibly present a much wider range of experiences. Also, a larger sample could have supplemented the research by adding for creative uses for the technology and other solutions to challenges addressed in this research.

C.   RECOMMENDATIONS

In implementing Intranets, the author recommends that the implementers should:

Establish the Information System vision and strategy as an integral part of the organizational strategy.

Employ IS personnel with skills in organizational management, analysis and business minded.

Plan and design Intranets that support a strategy that allows interoperability within the organization.

APPENDIX A. SURVEY

ZNA Information System Development Survey

Survey purpose: to access the current administrative communication system within the organization and evaluate the possibility of introducing/implementing Intranet. Please take a few moments of your busy schedule and tell me about how you feel about the current ZNA administrative communication system. The main aim is to evaluate the present communication system and then find possible solution.

All of your responses are strictly confidential. To answer survey question, please cross one circle beneath the appropriate answer or fill in the blank.

1. Who is your employer (check one)?

a. MOD   b. Army   c Air Force   d Other Ministry----------------

O   O   O   O

2. What is your common mode of administrative communication?

a. Letters   b. Telephone   c both a and b   d other: specify-----------

O   O   O   O

3. How effective is your current mode of administrative communication?

a. Not effective.   b. Do not know   c. Effective.   d. Very effective.

O   O   O   O

4. The use of computer is necessary in my job?

a. Strongly disagree.   b. Disagree.   c. Do not know.   d. Agree.

e. Strongly agree

O   O   O   O   O

5. I use a computer on most of my work.

a. Do not use.   b. Seldom use.   c. Often use.   d. Use daily.

    O   O   O   O

6. Have you ever heard of Internet?

a. No   b. Do not know.   c. Yes.

    O   O   O

7. How about Intranet, have you heard about it?

a. No.   b. Yes.

    O   O

8.   The introduction of Intranet will improve on ZNA administrative communication system?

a. Strongly disagree.   b. Disagree.   c. Do not know.   d. Agree.

e. Strongly agree.

    O   O   O   O   O

9.   Electronic mail (e-mail) is adequate to meet ZNA administrative communication needs?

a. Strongly disagree.   b. Disagree.   c. Do not know.   d. Agree.   e. Strongly agree.

    O   O   O   O   O

10. Does ZNA have more than one location?

a. No.   b. Do not know.   c. Yes.

    O   O   O

11. ZNA has a heterogeneous information technology?

a. No.　　　b. Do not know.　　　　c. Yes.

　　O　　　　　　O　　　　　　　　O

12. Do you contact clients electronically?

a. No.　　b. Do not know.　　c. Yes

　　O　　　　　　O　　　　　O

13. Does the current telecom bill represent the significant portion of the organization's ongoing business expense?

a. No.　b. Do not know.　c. Yes.

　　O　　　　O　　　　　　O

APPENDIX B: ABBREVIATIONS

ADPU	Army Data Processing Unit.
ASO1.	Administrative Staff Officer Grade 1.
ASO2.	Administrative Staff Officer Grade 2.
ASO1 PERS.	Administrative Staff Officer Grade 1 Personnel.
ASO1 PROT.	Administrative Staff Officer Grade 1 Protocol.
ASO1 PS.	Administrative Staff Officer Personal Services.
Brig. A	Brigadier Administration.
Brig. G.	Brigadier General.
Brig. Q.	Brigadier Quartermaster.
COL. A	Colonel Administration.
COL.G.	Colonel General Duties.
COL. Q.	Colonel Logistics.
COS. A.	Chief of Staff Administration.
COS. G.	Chief of Staff General.
COS. Q.	Chief of Staff Quartermaster.
COMMD. ZSC.	Commandant Zimbabwe Staff College.
DIR.ENGRS.	Director Engineers.
DIR FIN.	Director of Finance.
DIR PAY.	Director of Pay.
DAT .	Director Army Training.
ZMA .	Zimbabwe Military Academy.

APPENDIX C. COSTS OF PCs, MONITOR AND SATELLITE DISHES

Prices of computer and Monitor are from Costco taken on 5/16/99.

Specification of Computer and Monitor

PROGEN

CELERAM 333MHZ

Model: SVC 500C

32 MB SDRAM

15-INCH COLOR MONITOR

3.2 GB HARD DRIVE

40 XCD-ROM DRIVE

56K MODEM

PRICE $549.00.

CG Branch 15 X Units @ $549 each	=	$8,235.00
A Branch 15X units @$549 each	=	$8,235.00
Q Branch 15 X Units @ $549 each	=	$8,235.00
For 10 Dir. Each Dir. With 8Units @ $549each.	=	$43,920.00
10 X Brigades X 10 Units per Brigade @ $549 each	=	$54,900.00
30 X BNs. X 5 Units Per BN @ $549 each.	=	$82,350.00
ZMA 30 X Units @ $549.each	=	$16,470.00
School of Infantry 10X Units @ $549.each	=	$5,490.00
BBS X 15Units	=	$8,235.00
ZSC X 20Units	=	$10,980.00
6 X SERVICE CORPS TRAINING SCHS X 10Uni	=	$32,940.00

45X COMM. SATELLITE DISHES @ 3,500 each   = $157,500.00

SUM-TOTAL   = $393,570.00

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